

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-3 (cancelled)

Claim 4 (withdrawn): A cathode comprising:

a cathode mixture layer including a cathode active material and a binder, the binder including maleic acid-denaturalized polyvinylidene fluoride wherein the content of the maleic acid-denaturalized polyvinylidene fluoride in the cathode mixture layer ranges from about 0.5 wt% to about 4 wt%.

Claim 5 (withdrawn): The cathode according to claim 4, wherein the amount of the maleic acid-denaturalized polyvinylidene fluoride ranges from about 0.1 wt% to about 0.4 wt%.

Claim 6 (withdrawn): The cathode according to claim 4, wherein a part of the maleic acid-denaturalized polyvinylidene fluoride is substituted with hexafluoro propylene having a substitution ratio that is about 5 wt% or less.

Claim 7 (withdrawn): The cathode according to claim 4, wherein the cathode active material includes a lithium phosphorous oxide that has an olivine structure.

Claim 8 (withdrawn): The cathode according to claim 4, wherein the cathode mixture layer contains a conductive agent, and wherein the content of the carbon material ranges from about 5 wt% to about 12 wt% with respect to the total amount of the cathode active material and the carbon material.

Claims 9-11 (cancelled)

Claim 12 (withdrawn): A battery comprising:
a cathode, the cathode including a cathode active material and a binder including a maleic acid-denaturalized polyvinylidene fluoride;
an anode; and
an electrolyte,
wherein the content of the maleic acid-denaturalized polyvinylidene fluoride in the cathode mixture layer ranges from about 0.5 wt% to about 4 wt%, and wherein the battery has a charge final voltage that is about 4.0 V or less.

Claim 13 (withdrawn): The battery according to claim 12, wherein the amount of the maleic acid-denaturalized polyvinylidene fluoride ranges from about 0.1 wt% to about 0.4 wt%.

Claim 14 (withdrawn): The battery according to claim 12, wherein a part of the maleic acid-denaturalized polyvinylidene fluoride is substituted with hexafluoro propylene having a substitution ratio that is about 5 wt% or less.

Claim 15 (withdrawn): The battery according to claim 12, wherein the cathode active material includes lithium phosphorous oxide that has an olivine structure.

Claim 16 (withdrawn): The battery according to claim 12, wherein the cathode mixture layer contains a conductive agent including a carbon material, and wherein the content of the carbon material ranges from about 5 wt% to about 12 wt% with respect to the total amount of the cathode active material and the carbon material.

Claims 17-24 (cancelled)

Claim 25 (new): A cathode comprising:

a cathode mixture layer including a cathode active material and a binder, the binder including a styrene butadiene latex adhesive and a thickener

wherein the content of the styrene butadiene latex adhesive in the cathode mixture layer ranges from about 2 wt% to about 4 wt%, the content of the thickener in the cathode mixture layer ranges from about 0.5 wt% to about 2.5 wt%, and the thickener is polyacrylic acid, and

wherein the cathode active material comprises a lithium iron phosphorous oxide containing a carbon material, the lithium iron phosphate oxide having an olivine structure and the content of the carbon material being in the range of from about 5 wt% to about 12 wt% with respect to the total amount of the lithium iron phosphate oxide and carbon material.

Claim 26 (new): The cathode of claim 25, wherein the ratio of styrene-butadiene latex adhesive to polyacrylic acid is between about 0.8:1 to about 4:1 by mass.

Claim 27 (new): The cathode of claim 25 wherein the styrene-butadiene latex adhesive and polyacrylic acid represent greater than 2.3% weight and less than 6% weight of the cathode mixture layer.

Claim 28 (new): The cathode of claim 25 wherein the styrene-butadiene latex adhesive and polyacrylic acid represent from about 2.5% to about 5% weight of the cathode mixture layer.

Claim 29 (new): A battery comprising:

a cathode, the cathode including a cathode mixture layer containing a cathode active material, and a binder including a styrene butadiene latex adhesive and a thickener;

an anode; and

an electrolyte,

wherein the content of the styrene butadiene latex adhesive in the cathode mixture layer ranges from about 2 wt% to about 4 wt%, wherein the content of the thickener in the cathode mixture layer ranges from about 0.5 wt% to about 2.5 wt% and the thickener is polyacrylic acid, and wherein the battery has a charge final voltage of about 4.0 V or less, and

wherein the cathode active material comprises a lithium iron phosphorous oxide containing a carbon material, the lithium iron phosphate oxide having an olivine structure and the content of the carbon material being in the range of from about 5 wt% to about 12 wt% with respect to the total amount of the lithium iron phosphate oxide and carbon material.

Claim 30 (new): The battery of claim 29, wherein the ratio of styrene-butadiene latex adhesive to polyacrylic acid is between about 0.8:1 to about 4:1 by mass.

Claim 31 (new): The battery of claim 29 wherein the styrene-butadiene latex adhesive and polyacrylic acid represent greater than 2.3% weight and less than 6% weight of the cathode mixture layer.

Claim 32 (new): The battery of claim 29 wherein the styrene-butadiene latex adhesive and polyacrylic acid represent from about 2.5% to about 5% weight of the cathode mixture layer.